

Abstract

Arrays of separated lipid bilayers are disclosed. Also disclosed are methods of using the arrays and methods of forming the arrays. In addition, the invention provides useful systems and methods for selectively removing, collecting, and reconstitute lipid bilayers from specified regions of a surface. A stream of detergent solution is directed over a preformed bilayer, resulting in the removal of bilayer material. Diffusion-limited mixing between adjacent flows at low Reynolds number provides confinement of this stripping solution and, consequently, high precision. The freshly exposed surface allows formation of new connected bilayer when exposed to lipid vesicles. In conjunction with surface micropatterning and electrophoretic manipulation, the invention also provides a membrane-based separation/purification strategy.